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16th Annual FAA/TC/CAA Maintenance Human Factors Symposium

Integrating Human Factors in Maintenance and Inspection

Greetings

Good Afternoon. I am pleased to be speaking at the 16th Annual Symposium on Human Factors in Maintenance and Inspection.

I recall back, not so long ago, that this was a small meeting sponsored by FAA. In fact, my good friend Mr. John Goglia, attended these meetings, only a few years back, as a representative of the aviation maintenance technicians from his airline. John, the time is flying by, don't you think so?

Over the past four years this meeting is jointly sponsored by Transport Canada, the Civil Aviation Authority of the United Kingdom, and the FAA. And, each year the number of symposium delegates has grown. This shows the global aviation community's commitment to enhance aviation safety by focusing on human factors in aviation maintenance and inspection.

Most of the participants here have some active role in creating, operating, or regulating programs to promote safety. You do this by ensuring proper attention and implementation of the role of humans in maintenance and inspection. And there are **varying roles**.

In this speaking time, right after lunch – during desert, I know enough about Human Factors to know this speech should be short. It should motivate you to be glad that you invested the time and money to attend this symposium. My speech also encourages you to capitalize on the information and discussions that have been given already and for remaining 1 ½ days, here in San Francisco.

With that said, I want mention a few of our FAA initiatives that apply to safety issues associated to human performance. These actions that I describe prove of commitment that exceeds “lip service.”

First of all, let me make it clear. Maintenance Human Factors is an important safety issue. If that were not the case, the FAA would not spend the time and effort on the topic. We cannot ignore the challenges of the human in maintenance any more than we would neglect security, unapproved parts, personnel certification, air traffic issues, or certification of repair stations and other suppliers.

Human Factors are those conditions that affect how an individual technician, or team of technicians, completes a given maintenance or inspection task.

Such things as selecting the right person for the job, or training that person for the job, or changing the job to fit the person are examples. When we select and hire Aviation Safety Inspectors we have to consider these things. Of course, technicians are affected by environmental conditions. This not only limited to the cold or the hot but also to the general attitude that exists among the workers and management of an organization. The responsibilities and activities of maintenance personnel are broad. One moment the technician is a computer analyst involved in computerized fault isolation software and electronic documentation. Then, that same mechanic must climb a scaffold, or ladder, and wrestle a line replaceable unit from a tail cone, or from an avionics bay. And they often have to do this on short notice, with little practice, and under some time constraint. Finally they must document their work with the precision of an accountant. This example is laden with a variety of the “Human Factors” that can lead to error.

A Flight Standards Example

Within the FAA Flight Standards Service we started using the “Human Factors” word in the early nineties. The FAA’s Aviation Maintenance and Inspection research program was experimenting with hand-held computers for maintenance and inspection within the airline environment. Our Administrator at that time, General Thomas Richards, suggested that we focus the research on our own FAA Inspectors.

At the time we were answering Congress about aging aircraft, FAA oversight of inspection, and accuracy of FAA inspector data. In the past, the FAA would buy a few thousand portable computers in an effort to empower the inspectors. I am pleased to say that was not our approach. Instead we took a “Human-Centered” approach.

We looked at all the factors that affect our Aviation Safety Workforce. We actually took the time to talk to and, more importantly, to listen to inspectors from around the US. We characterized their actions using human factors tools – job and task analyses. Then, and only then, we selected hardware and software systems for Beta testing. We soon recognized that our efforts to empower inspectors with portable computers were much more than a mere hardware buy. We were affecting a cultural change.

Following the systematic and human-centered approach, we had to define resources, we sharpened our understanding of our business rules, and we created a computer-based inspection system. That system remains operational today throughout the FAA. We are convinced that the application of human factors design and implementation practices had a significant effect on the success of the program. The “human-centered” system that was developed is called the On-line Aviation Safety Inspection System (OASIS) and you can ask any Inspector, how they like it.

In summary of that OASIS project, we looked at the **People**, the **Environment** in which they worked, the **Actions** they had to perform, and the **Resources** necessary to contribute to their success. It worked!

So what are some of our Key Safety Initiatives Today?

First of all I want to assure you that we are committed to ensuring safety by **paying attention to the human factors in maintenance.**

As the Director of Flight Standards Service, it is our job to raise the safety bar. Today, aviation is still the safest means of travel. So how can we make it safer? We must move forward in sharing data, identify the precursors that lead up to an incident or accident. We must be proactive in developing and implementing prevention strategies. Sharing of information and data puts us in a position to identify these precursors and apply interventions to break the chain of events that leads to an incident or accident. Regulations are one way, but there are other means that we, by that we, I mean the government regulators and aviation industry, are cooperatively collaborating together on, to voluntarily implement program that make a difference. Some of these programs are part of the Administrators Safer Skies Agenda.

For example, The Aviation Safety Action Program, commonly referred to as ASAP, focuses on bringing together the FAA, airlines and unions to encourage the reporting of safety concerns. Several US airlines have their Maintenance Human Factors or Maintenance Resource Management programs as part of their ASAP.

This program puts a framework around the process of how we share information and data. This program also lays the foundation for building trust and trustworthiness. ASAP is administered by policy not by regulation. To be sure that the ASAP program is responsive to the concerns of the participants, the FAA established a joint FAA-industry-labor Aviation Rulemaking Committee to work together on program policy.

In order to foster and encourage voluntary sharing of safety and security data, Congress provided the FAA with the statutory authority to protect such data. The new FAR Part 193, which protects voluntarily provided safety data became effective on July 25, 2000. Except when criminal or deliberate acts are involved, voluntary provided ASAP data will be protected from disclosure.

Another program is our Air Transportation Oversight System, which is referred to as ATOS. We believe that the system safety approach is the best approach for certification and surveillance. ATOS is data driven system that can identify and mitigate emerging safety risks before an incident or accident occurs.

In the US many airlines have voluntarily implemented human factors in everyday operations and provide human factors training such as Maintenance Resource Management (MRM) that was developed by the FAA research program. In September 1999, the FAA issued an Advisory Circular on MRM training to provide the necessary guidance to industry.

In FAA, we have initiated MRM training for all of our safety inspectors. Starting this year we are providing Maintenance Resource Management Training to nearly 3000 Aviation Safety Inspectors. You have helped introduce the concepts to many of our

inspectors. Now, we want to formalize their knowledge, continue to recognize and stress the importance of human factors in aviation maintenance and the role that the human is an integral part of safety. We believe the Inspector training is just one step in the right direction.

This year, I with Jean Watson to ensure that every Aviation Safety Inspector had a copy of the latest Maintenance and Inspection Human Factors CD-ROM that was derived from 13 years of research. The combination of the training, the CD-ROM, and the on-going maintenance human factors website will ensure that FAA personnel have access to the same information that industry is using. We believe that, once our Inspectors further develop an understanding and appreciation of the human factors that affect maintenance safety, they will be better qualified to work with you to share data related to human error and human performance. We know we can learn a lot from the maintenance human error data. There are opportunities to improve the way we collect and use such information. We are working together with you to achieve the necessary cultural change to capitalize on this rich information. As you have heard yesterday and will continue to hear over the next couple of days, these presentations are some excellent examples of processes that can be implemented to help identify and mitigate these incidents, from a human factors perspective, and ways to share data and to be preventative in the future.

The FAA is also in the process of developing a Continuing Analysis and Surveillance System (CASS) model to be used by FAA in accepting and evaluating a CASS in the aviation industry. This model will and appropriate guidance will help the aviation industry in developing, implementing, and operating a CASS that meets FAR 121.373 and 135.431. As a core element of the model, human factors, human performance and human error analysis and mitigation will be integrated. The CASS model will provide improvements in FAA's oversight of CASS and the aviation industry's compliance with CASS requirements. We expect this model to be completed by September and we will issue the appropriate guidance material after completion.

I would like to acknowledge the efforts made in the UK, Canada and Europe, CAA, TC as well as the JAA to ensure that human factors training is regulatory in their safety management programs and that the appropriate authorities will perform regulatory oversight. I complement them on their efforts in recognizing the role that humans have in safety.

Security Issues

We are currently surrounded by the multitude of issues associated with security in all aspects of the industry. FAA staff tasked with this responsibility shall pay attention to all of the human factors that affect security. In many cases they are the same factors that you have been studying and addressing since the maintenance and inspection human factors program started in 1988. Over the years, much research has been conducted on procedures, training, visual inspection, teamwork, fatigue factors, and there was literally an FAA Aviation Maintenance and Inspection Human Factors Guide that was written. FAA would be wise to revisit your findings and apply the lessons that you have learned

to the same human factors in security. But it is important that we remain focused on human error in aviation maintenance in addition to security.

Conclusion

Times are tough. Both the FAA and industry are sometimes spread thin and under-resourced but we are doing well. Accident rates in the airlines are down worldwide. 2001 was one our lowest accident rate in history. But even one loss is too many. No situation will ever make us cease our vigilance over all safety issues in aviation. We need to collect data and analyze this data to look for trends where human error and mistakes are made and can be avoided or corrected. During this symposium you had the opportunity to see some of these tools that are available to implement in your organization.

Within Flight Standards we see Human Factors as one of our most important safety initiatives. We intend to take the former Human Factors Research and integrate these applications and principals into a Systems Safety in Aviation Maintenance approach.

Together, we can accomplish goals to reduce human error and enhance human performance to reduce the accident and incident rate contributable to humans in the system. We must integrate human factors principals in everyday operations.

I thank you for your continued vigilance over maintenance and over the humans that are the key component to continuing airworthiness and safety and your ongoing efforts of disseminating information on aviation maintenance human factors as a key safety initiative that affects all of us globally.

With that, I would now like to “Pass the Torch” to Transport Canada.